KLING & FREITAG

LINE 212-6 / -9

User's Manual

Version 5.0
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Important Information, Please Read Before Use!

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KLING & FREITAG
SOUND SYSTEMS

Thank you for your decision to buy a KLING & FREITAG sound system. To guarantee a trouble-free operating of the equipment and to allow the KLING & FREITAG - Line 212 system to achieve its full potential please read the operating instructions carefully before use.

With the purchase of a Line 212 system, you have acquired a P.A. system with the highest possible quality and performance capabilities.

As the owner of a Line 212 System, you now have a versatile and highly professional tool which, when operated properly, is a true pleasure to use.

Symbols in User's Manual

Warning

This symbol indicates the possibility of life-threatening danger and a health risk for persons. Not following these instructions may result in serious health problems including potentially fatal injuries.

Caution

This symbol indicates a possibly dangerous situation. Not following these instructions may cause minor injuries or cause property damage.

Important

This symbol gives instructions for the proper use of the described products. Not following these instructions may cause malfunctions or property damage.

Information about this User's Manual

User's Manual LINE 212-6 / -9, Version 5.0, 08.09.2005

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All specifications in this manual are based on information available at the time of publishing for the features and safety guidelines of the described products.

Technical specifications, measurements, weights and properties are not guaranteed. The manufacturer reserves the right to make product alterations within legal provisions as well as changes to improve product quality.

All persons who use the speaker system must have this guide and all further information for safe operations available to them during assembly, disassembly, and use.

We appreciate any input with suggestions and improvements for this manual. Please send this to us at the following address:

info@kling-freitag.de or to:

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1. General Safety Instructions for Speakers

Mounting the speakers

To prevent injury, this equipment must be securely placed on the floor or secured to the wall according to the mounting instructions on page 16 (Mounting Instructions for Speakers). Please note that speakers can move as a result of vibrations. To prevent them from falling from their mounted position, they must be secured properly. If the weight of the speaker exceeds 20 kg then it is necessary for two people to carry it.

Speakers may only be mounted to wall and ceilings by qualified personnel. The speakers must be hung by using at least two of the designated flying points. The same applies when lifting and aligning the speakers.

Never use signal cables or power cords for suspending, aligning or securing the systems. When laying the connecting cables, make sure that nobody can trip.

For mobile and fixed installations, use only assembly equipment from KLING & FREITAG.

Ensure that all installation connections comply with the applicable safety guidelines and that the size and strength are sufficient. Further instructions are in our user's manual for assembly equipment and in the general safety instructions for speakers and assembly equipment.

For mobile and fixed installations, use only assembly equipment from KLING & FREITAG. Make sure to observe the included safety and mounting Instructions for loudspeakers and accessories.

Speakers and rigging equipment must be visually examined at regular intervals. If there are signs of wear, they must be replaced immediately. Furthermore, screwed connections of supporting parts must be checked routinely.

Protecting the speakers / operating safety

In general, audio signals should not be overdriven. This may be caused by mixing consoles, equalizers, effect equipment, etc. and should be indicated on this equipment. When a power amplifier is overloaded at the output (clipping), then the amplifier should activate a clipping warning signal. Power amplifiers can also be overloaded at the input circuit without the amplifier signalling the clipping, i.e. when there is not sufficient headroom in the input circuit. We, therefore, recommend turning up the power amplifiers all the way and adjusting the level before the power amplifier in order to avoid overloading the input circuit. In any case, the signal must be reduced as soon as it sounds unnaturally distorted.

- To protect the speakers from being destroyed, they should only be operated with professional power amplifiers with a maximum rated power of 1400W@6Ω (equivalent 2100W@4Ω).
- If power amplifiers have power ratings lower than mentioned above, then it is imperative that a clipping limiter is used to protect the speaker even if it is used with a Kling & Freitag system controller.
- Operating safety and maximum performance of the LINE 212 System can only be guaranteed when used with the C2 Controller. We cannot offer a guarantee for overload damage resulting from use with a controller aside from the C2.

For damage caused by

- overloading the speakers
- using the speakers with power amplifiers other than those recommended above
- using the speakers without a controller or with a controller other than the K&F C2 Controller,

Kling & Freitag GmbH does not assume warranty and excludes liability for possible consequential damage.

Important

The following signals may damage the speakers

- permanent high-pitched signals with high frequency and continuous noise from feedback.
- permanently distorted signals with high power.
- noises, which occur when the amplifier is on while equipment is being connected, disconnected or switched on.

Do not install devices in any of the following places:

- where the devices are permanently exposed to direct sunlight.
- where the devices are exposed to high moisture or rain.
- where the devices are exposed to strong vibrations and dust.

Damage caused by the speakers' magnetic fields

Speakers are permanently surrounded by a magnetic field, even when they are not operating. Therefore, during transport and placement of the speakers, it is important to ensure that there is always approx. 1 m between the speakers and magnetic data media and computer/video monitors.

Caution

Preventing hearing damage

To prevent the risk of hearing damage, avoid being too close to operating speakers, even if the volume level seems to be low enough. In general, volume levels over 90 dB can cause hearing damage.

2. Product Descriptions and Versions

2.1 LINE 212 - 6

Short description:

2+1-way, completely horn loaded full-range speaker system with bass reflex tuning. Integrated passive crossover with patented 'FLC technology' corrects delay times and phase. Operations via specific system controller or signal processor with system macros. Components: two horn loaded 12" chassis and one 1.5" high frequency driver on a rotatable 65° x 50° CD-horn.

Enclosure:

Trapezoidal birch plywood enclosure with highly resistable structured black (RAL 9005) or grey (RAL 7016) paint, 4 'allsafe JUNGFALK' flying points, 1 rear mounted 'allsafe JUNFALK' flying track, 2 butterfly handles, locking profiles for transport cover, stacking sliders and corresponding stacking grooves for stacking identical enclosures, ball proof steel grille covered with exchangeable black acoustic foam.

Optional versions:

- LINE 212-6 - 'Outdoor Installation' / 'Outdoor Mobile'
  Version for outdoor use under roofs.
- Special finish in RAL colours
- LINE 212-6 - SP:
  Version with integrated power amplifier technology
  '*SP' speakers are shipped with a separate user's manual!*

2.2 LINE 212 - 9

Short description:

2+1-way, completely horn loaded full-range speaker system with bass reflex tuning. Integrated passive crossover with patented 'FLC technology' corrects delay times and phase. Operations via specific system controller or signal processor with system macros. Components: two horn loaded 12" chassis and one 1.5" high frequency driver on a rotatable 90° x 50° CD-horn.

Enclosure:

Trapezoidal birch plywood enclosure with highly resistable structured black (RAL 9005) or grey (RAL 7016) paint, 4 'allsafe JUNGFALK' flying points, 1 rear mounted 'allsafe JUNGFALK' flying track, 2 butterfly handles, locking profiles for transport cover, stacking sliders and corresponding stacking grooves for stacking identical enclosures, ball proof steel grille covered with exchangeable black acoustic foam.

Optional versions:

- LINE 212-9 - 'Outdoor Installation' / 'Outdoor Mobile'
  Version for outdoor use under roofs.
- Special finish in RAL colours
- LINE 212-9 - SP:
  Version with integrated power amplifier technology
  '*SP' speakers are shipped with a separate user's manual!*

3. Important Notes for the 'Outdoor' Option

Speakers with the option 'Outdoor Mobile' and 'Outdoor Installation' have been optimised for outdoor use. They withstand temperature fluctuations in moderate climate zones and do not accumulate condensation water.

In order to guarantee the longevity and safety of the speakers, the speakers with the option 'Outdoor' must still be protected from direct effects of the weather.

They should be installed, for example, under a roof so that they also have sufficient protection from driving rain from the side and direct sunlight.

3.1 'Outdoor Mobile'

Version for mobile outdoor use under roofs.
Features like standard version but with the following extras:

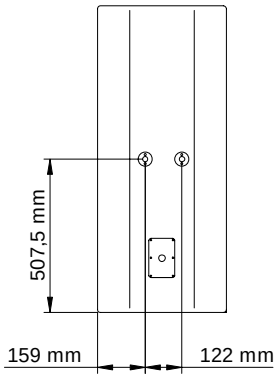
- multi-layered, temperature and UV-resistant high-tech PU marine primer,
- final coating with highly resistant structured 2K paint in RAL colours,
- waterproofed diaphragms and electronic components protected against corrosion with protective coating.

3.2 'Outdoor Installation'

Version for fixed outdoor installations under roofs.
Features like 'Outdoor Mobile', but with the following differences:

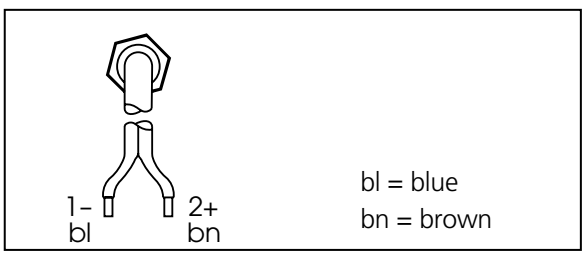
- No handles, feet, stacking foot grooves and locking profile for transport cover.
- Stainless steel flying points M 10 x 18 instead of 'allsafe JUNGFALK' flying points (positions and load capacity are the same)
- Instead of rear mounted flying tracks: two stainless steel thread inserts M 10 x 18 as flying points (load capacity 60 kg / point)

Tighten all screwed connections on the speaker and protect them against coming loose.



- Single stainless steel grille instead of parted steel grille.
  a. The complete grille must be removed when turning the horn. Remove the screws on the grille.
- Foam covering behind the grille.
- Visible screws made of stainless steel.
- Stainless steel connecting terminal with single PG cable fitting, Ø 13 mm

Connector:



4. Rigging Instructions for Line 212 Systems

The speakers may only be mounted by trained specialised personnel with proof of their qualifications as a certified 'rigger'.

Please follow the accompanying instructions for speakers and assembly equipment.

Ensure that all connections are secured to prevent their detaching on their own and that only admissible statically tested and sufficiently sized connecting devices, ropes and chains are used.

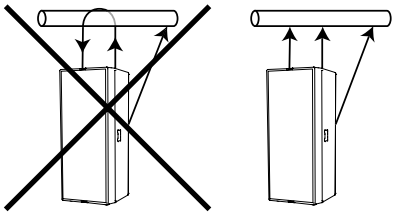
Pay attention to the required safety factors. Make sure to observe the included safety and mounting instructions.

A maximum load of 73 kg may be suspended from the two flying points of one Line 212 system. **This means a maximum additional load of 36.5 kg on each 'allsafe JUNGFALK' flying point.** This applies for both vertical (see details on this page) and horizontal suspension (see details on next page).

4.1 Vertical Suspension

The Line 212 System must always be mounted with two wire ropes or chains, which are independent of one another! Furthermore, the systems, no matter if individual or connected to one another, must be secured onto the 'allsafe JUNGFALK' flying track on the rear. This safety rope may be used for aligning the systems.

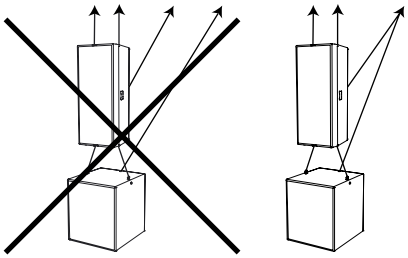
The safety rope must have a minimum length of 100 cm and must be attached so that, in case it falls, the height of the fall is kept to a minimum. A possible fall height of 20 cm may not be exceeded! With a higher fall height, the dynamic load of a fall could be inadmissibly high; potential risk of system crash.



The safety ropes of different systems must always come together at one point.

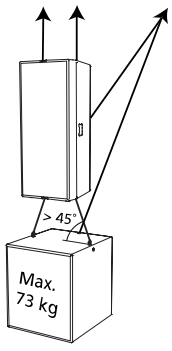
Each of the utilised separate lifting accessories (chains / wires / shackles) must be able to carry the 12-fold load of the total weight.

While installing, be sure that the system can swing in case a rigging point fails. With this in mind, the speaker must be mounted so that no people or objects are within the potential range of the swinging speakers.



The weight of the speaker hung below may not exceed 73 kg (this weight corresponds to the approx. weight of a SW 215E-SP).

The angle of the rope / chain to the top of the speaker mounted below may not exceed 45°.



4.2 Horizontal Suspension

If a speaker unit consisting of several connected systems is to be flown and aligned, then the individual speakers must be attached to one another before connecting them to the 'allsafe JUNGFALK' Flying Track. Consult the provided illustration when doing so. For the rear connection of the loudspeaker systems use the double stud fittings available from Kling & Freitag and a proven 1/2" shackle (alternative single stud fittings and 3/8" shackle). Pull the threaded bolt of the shackle with a torque of 10 Nm **(hand-tight with 200 mm long lever, e.g. screwdriver). Alternatively, you can use proven, high-strength shackles with a split pin.** Only in this way can you ensure that the bolt will not become loose.

The 'allsafe JUNGFALK' Flying Track can only support weights up to 73 kg. Therefore the load must be distributed on several flying tracks when suspending the systems.

For horizontal operations, the system is designed for a maximum array of 3 Line 212-6 systems. More of theses systems may not be flown below one another.

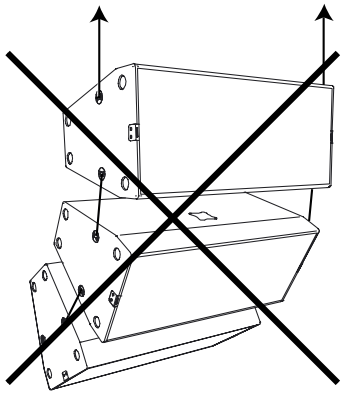
We recommend using the BGV C1 certified and type tested Click & Fly Rigging System for mounting the Line 212 systems (see the 'Click & Fly for Line 212 / SW215E' user's manual).

Please pay attention to the following instructions for flown operations without the Click & Fly rigging system:

Wrong:

– The upper rigging points of the top speaker must carry the full load. Consequently, the permissible max. load of the top points is exceeded.

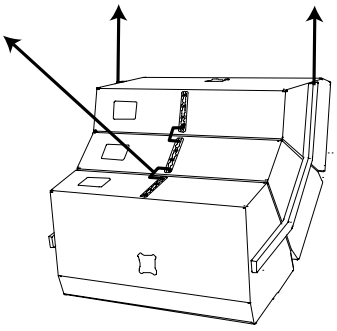
– The speakers are not secured by the additional safeties



Right:

– The load of the individual speakers is threaded through the bent continuous bracket. The load is, therefore, held by the bracket, and the speakers' flying points consequently only have to carry the load of the corresponding speaker.

– The speakers are connected to one another on the rear. The suspension point is located on the connection of the two lower speakers. As a result, the load is distributed to both speakers.



5. Using the 'allsafe JUNGFALK' Flying Points

Single Stud Fitting
Used as fastener to the 'allsafe JUNGFALK' Flying Point.

'allsafe JUNGFALK' Flying Point
Receptacle for special fasteners.

1.)

Take the single stud fitting in one hand...

2.)

... and push the locking device up against the spring tension.

3.)

Put the flat head of the holding bolt into the guiding of the flying point.

4.)

Release the locking device when the single stud fitting is located in the middle of the flying point. Make sure that the locking device clicks into place.

5.)

Check that the single stud fitting is securely fastened and cannot be pulled out.

6. Using the Rear Mounted 'allsafe JUNGFALK' Flying Track

Warning

The 'allsafe JUNGFALK' Flying Track can be used for fixing and adjusting the speaker systems.

The 'allsafe JUNGFALK' Flying Track can only support weights up to 73 kg!

Please also consult the provided instructions for speakers and assembly equipment.

6.1 Mounting the Single Stud Fittings

Single Stud Fitting

Used as fastener to the 'allsafe JUNGFALK' Flying Point and the 'allsafe JUNGFALK' Flying Track.

'allsafe JUNGFALK' Flying Track

Receptacle for special fasteners such as the single stud fitting.

1.)

Take the single stud fitting in one hand...

2.)

... and push the locking device up against the spring tension.

Warning

3.)

Slide the flat head of the holding bolt into the guiding device of the flying track and slide the single stud fitting sideways into the flying track.

4.)

Release the locking device when the single stud fitting is located over the tabs of the track. Make sure that the locking device clicks into place and check that it is securely fastened.

6.2 Mounting the Double Stud Fittings

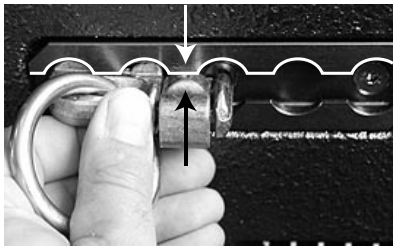
Double Stud Fitting

Used as fastener to the 'allsafe JUNGFALK' Flying Point and the 'allsafe JUNGFALK' Flying Track.

'allsafe JUNGFALK' Flying Track

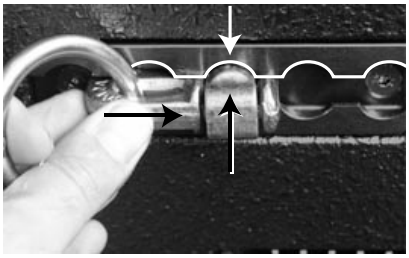
Receptacle for the double stud fitting.

1.)



Align the double stud fitting as shown above and push it into the track,…

2.)



… slide the pushed double stud fitting to the middle of the speaker until it clicks into place. Make sure that it is secured tightly.

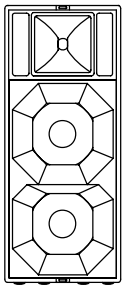
Warning

7. Coverage Pattern of the Line 212 Systems

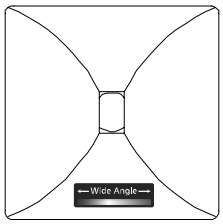
The Line 212 can be operated in a vertical or horizontal position. The coverage pattern of the speaker can be adapted to special needs by a 90° rotatable horn.

The following graphics demonstrate how to recognize how the built-in horn emits in a standing speaker: To determine the coverage pattern of the high frequency horn, shine a flashlight through the front covering at the level of the horn. You will find a silver stripe that determines the position and coverage angles of the horn.

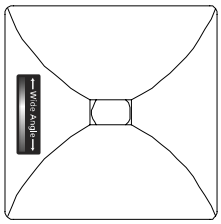
DEFINITION:



Standing speaker:



Horn not rotated



Horn rotated

Model	Horn not rotated	Horn rotated
Line 212-6	65° h x 50° v	50° h x 65° v
Line 212-9	90° h x 50° v	50° h x 90° v

7.1 Changing the Coverage Pattern

The front grille of the Line 212 is divided into two sections (except the version 'Outdoor Installation'). Changing the coverage angle is possible by only removing the upper section of the grille. To turn the horn, follow these steps:

1) Remove the four grille mounting screws from the top on the sides of the speakers with a 3 mm Allen key and remove the grille from the speaker enclosure. It may be necessary to use a screwdriver in the middle of the top grille edge to pry up the grille. There is a groove in the grille in this position (under the locking profile) just for this purpose.
2) Remove the 6 screws from the high frequency horn (also using a 3 mm allen key). Loosen the high frequency horn by using both hands, palms to the outside, to grasp into the horn and lift the horn with even pressure from the palms of your hands towards the outside. Never use a screwdriver or similar objects to reach behind the edge of the horn, as this could damage it.
3) Rotate the horn 90° and screw the horn on tightly again (do not force it!).
4) Screw the grille on tightly.
5) You will notice twelve fastening screws under the front foam of the 'Outdoor Installation' version. Lift up the front foam carefully and loosen the screws with a screwdriver for cross-recessed screws. Remove the grille from the speaker enclosure. Continue with step 2).

If the coverage angle needs to be changed often, make sure that the horn is not always rotated in the same direction, as the connecting cables may cause the contacts of the driver to become loose.

8. Mounting Instructions for Speakers

Mount the speakers securely. To avoid injury or damage, always be sure to mount the speakers securely so that they do not fall. Speakers, which are stacked, must be secured with securing straps. When laying the connecting cables, make sure that nobody can trip.

The stability of stacked systems (also valid for the use of stands and distance rods!) is contingent upon the following stability requirement. These conditions must, therefore, be guaranteed by the user:

Stacked systems may not fall over even if they are inclined by 10° in each direction. If this requirement is not fulfilled, then it is necessary to take steps to achieve compliance. Possible measures include strapping it to an appropriate base structure or fastening it using safety straps.

We recommend using the optionally available transport covers with castors when transporting and positioning the system. These covers have handles, which considerably simplify the carrying and stacking of the Line 212 Systems. We therefore recommend removing the covers after the systems have been positioned. Always loosen the lower catch first so that the cover does not fall over.

8.1 Proper Arrangement of the Loudspeakers

Be aware of the fact that the logical targeted alignment of this high quality speaker system can lead to a significant qualitative increase in the acoustic result. It is not possible to make generalities about the alignment of specific systems because the room has a substantial influence on the signal and the audible result.

As a rule, the mid- and high-transducers of loudspeakers should be mounted above the audience's face value, so that the sound distribution cannot be shadowed.

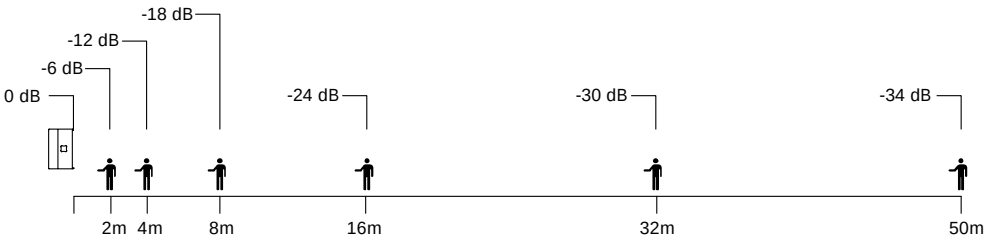
In many cases it is advisable to mount a loudspeaker higher, so that the sound will be distributed throughout the room more evenly. Low standing systems result in a greater difference in volume between front and back seats than higher standing systems.

Please note that this is only a general guideline and the best possible result may vary from room to room.

To simulate the correct alignment of the speakers beforehand, there are various programs such as 'Ease' or 'Ulysses'. The Kling & Freitag speaker system data is available for download on our website www.kling-freitag.de.

The following graphics will assist in making a rough estimate as to the distance range of speaker systems. The graphics only take into consideration the sum of the direct sound and not the influence of the room. Because of this there can, in some cases, be noticeable deviation.

Distance range of SPL (direct sound level):



8.2 Arrayed Speaker Systems (Cluster)

If the loudspeakers are operated through the optional K&F C2 System Controller, we recommend to turn on the 'Top Low Cut' switch for clustered operation. Thus the frequency response for this application can be optimised (see also K&F C2 User's Manual).

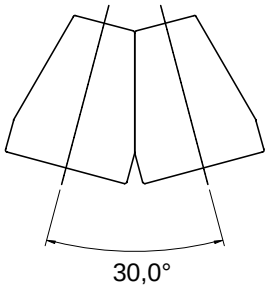
If the Line 212 Systems are operated in a cluster without the C2 Controller (speakers are set up directly next to one another), then lower the 'EQ LOW CUT' frequency as described below!

	EQ LOW CUT
Frequency	120Hz
Quality (Q)	0.55
Bandwidth (oct.)	2.35
Level	-2.95dB

1. If several Line 212-6 with a horn coverage pattern of 65°h x 50°v are arranged on one side (cluster / array), it is recommended for the Line 212-6 to have a horizontal array angle of 38.5° to one another (see fig. 2).
2. In a cluster comprised of a combination of the Line 212-6 with Line 212-9, we recommend an array angle of 45° (see fig. 3).
3. With a rotated horn (Line 212-6 standing: 50°h x 65°v / Line 212-9 standing: 50°h x 90°v), an array angle of 30° is recommended for both versions (see fig. 1).

Because increased interference effects occur when several 90° systems are arranged next to one another, the clustering of several Line 212-9 is only conditionally recommendable.

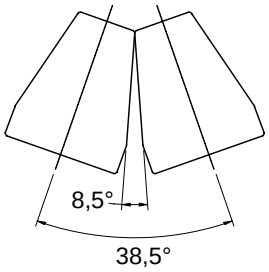
Fig. 1



Line 212- 6
(horn rotated)
horn 50° h x 65° v

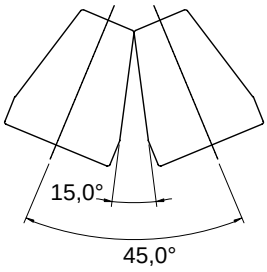
Line 212-9
(horn rotated)
horn 50° h x 65° v

Fig. 2



Line 212-6
(horn not rotated)
horn 65° h x 50° v

Fig. 3



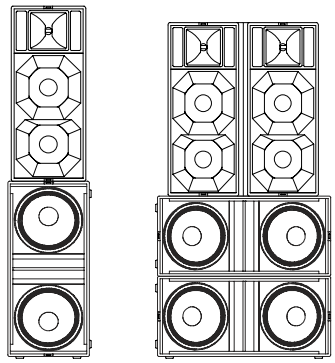
Combination
(horns not rotated):

Line 212-6
Horn 65°h x 50°v

with

Line 212-9
horn 90°h x 50°v

8.3 LINE 212 Systems on Top of SW 215E

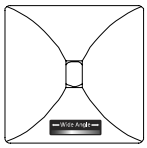
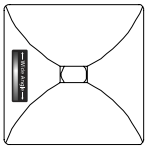
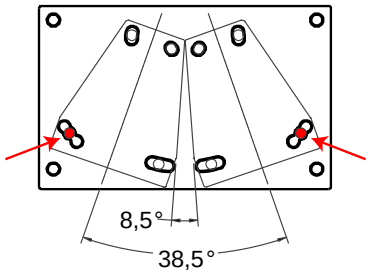
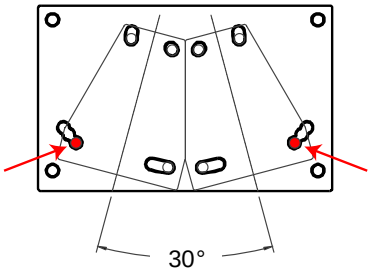
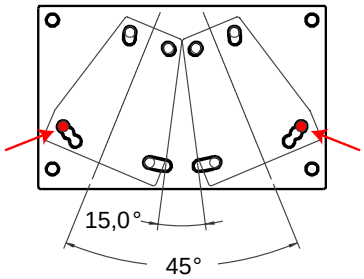


In addition to the stacking foot grooves for stacking the same enclosures, the subwoofer SW 215E also has stacking foot grooves for the Line 212 System.

One Line 212 System can be quickly and safely positioned on top of a vertically placed SW 215E.

Two Line 212 Systems can be precisely arrayed on top of a horizontally placed SW 215E.

Mounting Instructions for Speakers on page 16

	 Horn not rotated on standing Line 212 system	 Horn rotated on standing Line 212 system
Line 212-6 with Line 212-6		
Line 212-6 with Line 212-9		

Other combinations of Line 212 Systems are not recommended as they can cause unwanted interferences

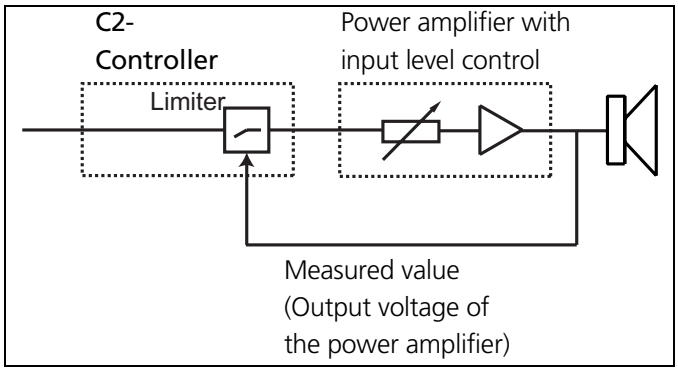
9. Operations with the K&F C2 Controller

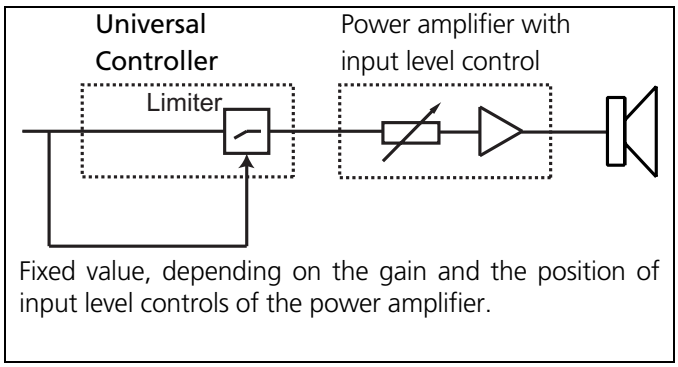
The use of carefully adjusted filters (EQ) on the system plug-in cards enables the C2 Controller to optimise the feedback stability and the frequency response of the Line 212 System. We do not recommend operations without the C2 Controller.

Operating safety and maximum performance of the LINE 212 System can only be guaranteed when used with the C2 Controller. We cannot offer a guarantee for overload damage resulting from use with a controller aside from the C2. As a rule, the Line 212 systems should only be operated with a system equalisation (filter). If, despite this risk, the LINE 212 system should be run with another controller, we will send further instructions upon request.

The C2 Controller optimises the operating safety of speakers and power amplifiers through special peak and RMS limiters with sense technology:

With other (universal) controllers, the gain of the selected power amplifiers must be known. The limiter on the C2 Controller, on the other hand, uses a special control circuit to determine the actual output voltage of the power amplifiers. The limiter then reduces the input level only when the power amplifier actually provides more power than the speakers can handle. The amplifier's gain and the position of the input level control for the power amplifiers are insignificant for the limiter function of the C2 Controller.




Universal
Controller
Limiter
Power amplifier with
input level control
Fixed value, depending on the gain and the position of input level controls of the power amplifier.

9.1 Operations with Additional Bass Systems via C2

With the K&F bass systems, it is no problem to expand the low frequency range with additional bass systems. The C2 with specific plug-in system cards offers a 2-way stereo crossover to separate the transmitted signals into frequency bands for the Line 212 system and for the connected subwoofer systems. It adjusts the delay times and phases of the Line 212 system and the subwoofers. Because of this, an optimal combination of the Line 212 systems and all K&F bass systems is made possible. In doing so, the bass system B10 plays a special role. More information in the following section.

When operating using additional bass systems, it is, however, very important that when adjusting the power amplifier, the levels of the tops and the bass systems are matching. This adjustment is done by the sound engineer with the sub gain control of the C2 Controller.

9.1.1 Line 212 via C2 and Bass B10 via C10 Controller

When used parallel to the Line 212 System, the subwoofer system ACCESS B10, controlled by the K&F Controller ACCESS C10, provides an ideal bass supplement.

The C 10 Controller is equipped with configuration switches for various configurations and uses. A special electronic circuit frees up reserves from the B10 for the sub-low range. Compared to the possible use with a C2 Controller, the operations with a C10 Controller provide increased bass performance.

9.1.2 Line 212 and Bass B10 via C2 in 2-Way Active Mode

When operating in this mode, the 'Full-range' switch on the C2 Controller should not be pressed, the corresponding 'Full-range' LED is not lit!

In the 2-way active mode, the Line 212 is relieved of the high-energy bass signals and can, therefore, produce a significantly higher sound pressure level. With this, the number of necessary bass speakers to reproduce the correct sound level relationship is increased.

The C2-Controller is configured for 2-way active mode in the following way:

If 2 or 3 Line 212 systems are mounted on top of 2 stacked B10 bass systems, the gain of the power amplifier for the Line 212 should equal the gain of the bass amplifier in stereo or dual mono mode (with level controls in maximum position).

If only one top is stacked on one bass system B10, then the gain of the bass system's power amplifier should be increased by approx. 4-5 dB.

9.1.3 Line 212 via C2 in Full-Range Mode and Bass B10 via C10

When operating in this mode, the 'Full-range' switch on the C2 Controller should be pressed, the corresponding 'Full-range' LED is lit!

Because a large portion of the bass range in full range mode is covered by the Line 212, less bass systems are necessary than for 2-way active mode in order to produce a balanced sound level ratio between the tops and the bass speakers. In this mode of operations, the maximum possible top level is lower than for 2-way active mode. Depending on the music programme, it is, for example, recommendable to use one bass system B10 for two or three Line 212 systems.

Note

The recommended ratios between bass systems and Line 212 systems are intended to be used as reference values. The correct ratio of the numbers of bass speakers and mid/high speakers may vary with different configurations and applications. This results from the different coverage patterns of the bass and mid-high speakers. The sound level of the stacked basses increases by max. +6dB when doubling the number of speakers (+3dB efficiency plus 3dB by doubling the power amplifier level). The loudness of the tops increases in a different manner because of the directivity. The position of a bass speaker is also crucial for its actual sound level. A bass speaker, which is on the floor, can be a few decibels louder than a flown bass system because of the floor reflections. Because of this, a sound engineer must always fine-tune the system using the level control of the C10 or the sub gain control of the C2 (not on the mixing console!).

Operating instructions for the C10 Controller are in the user's manual 'ACCESS SYSTEM' and for the C2 Controller in the user's manual 'K&F Controller C2'.

10. Wiring

The Speaker is equipped with two parallel-wired Speakon connectors.

Before connecting your Line 212 system as shown in chapter 10.3 , be sure to switch off all connected appliances and turn down all level controls.

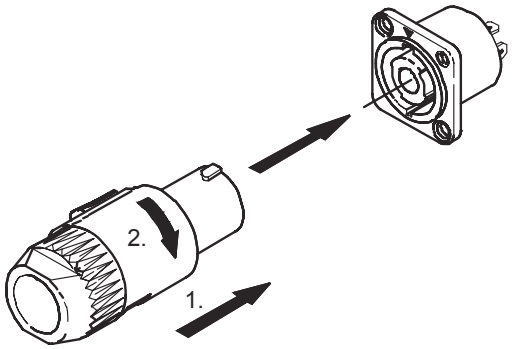
- We recommend the use of high-quality cables provided by KLING & FREITAG.
- For connections to the power amplifier inputs, please use 2-pin shielded microphone cable with high-quality connectors.
- Avoid ground loops (see chapter 10.2)
- Please pay attention to the respective pin diagrams in this manual!
- To ensure an in-phase operation and, consequently, a homogeneous sound, make sure that the +/- polarity of the speakers at the amplifier is correct.
- When simultaneously using power amplifiers from different manufacturers, be sure to use the correct specific pin configuration. It may be necessary to modify the pin configuration on the power amplifiers or on the connectors leading to them.
- To avoid loss of power, the cables should have a minimum wire gauge of 2.5 mm² - more for longer cabled distances. A minimum wire gauge can be easily calculated with the following formula:

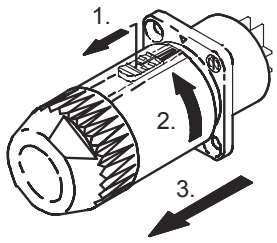
$$\text{Minimum wire gauge (mm²)} = \frac{\text{required cable length (m)}}{\text{2 x speaker's impedance (}\Omega\text{)}}$$

If several loudspeakers are connected, the signal can be linked through from one loudspeaker to the next. Please make sure that the total impedance of the loudspeakers R (W) is not lower than the minimal impedance indicated on the power amplifier.

$$1/R_1 + 1/R_2 + 1/R_3 + \ldots = 1/R_{total}$$

10.1 Connecting the Speakon Plugs to the Connecting Terminal





10.2 Avoiding Ground Loops

10.2.1 What is a Ground Loop?

Every component of a P.A. or Hi-Fi System has its own internal 0V reference (ground). This point is often connected to the protective earth connector (PE / Ground). If two or more units are connected to one another with a line level audio cable, there may be a ground connection through the ground of the power supply cable (yellow-green) as well as through the shielding of the audio cable. The voltage difference between these two ground points causes audible interference to come from the speaker.

10.2.2 Avoiding Ground Loops

If there is a loud humming or buzzing after the speaker has been connected, then check that a "ground loop" has not been built into the system. Some power amplifiers and system controllers facilitate a ground lift switch. Set these ground lift switches to the 'Lift' position one after the other. If the noise is still audible, check if

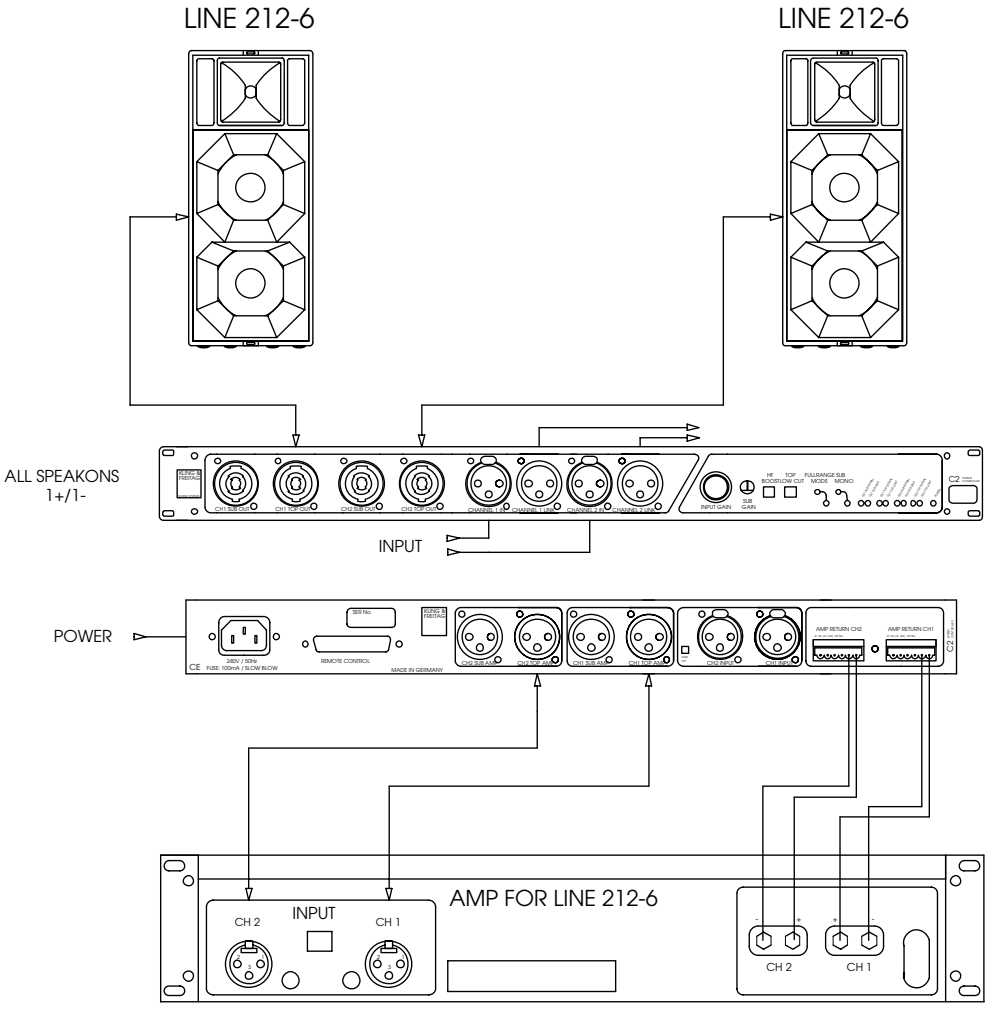
1. the noise is caused by a ground loop before the power amplifiers or controllers (e.g. mixing console, effects or equalizers).
2. the system or parts of the system are connected to an 'unclean' power supply - meaning one, which is also running large motors, or lighting systems. An 'unclean' supply voltage, electrostatic and electromagnetic fields can cause interference.

Please observe the following basic rules:

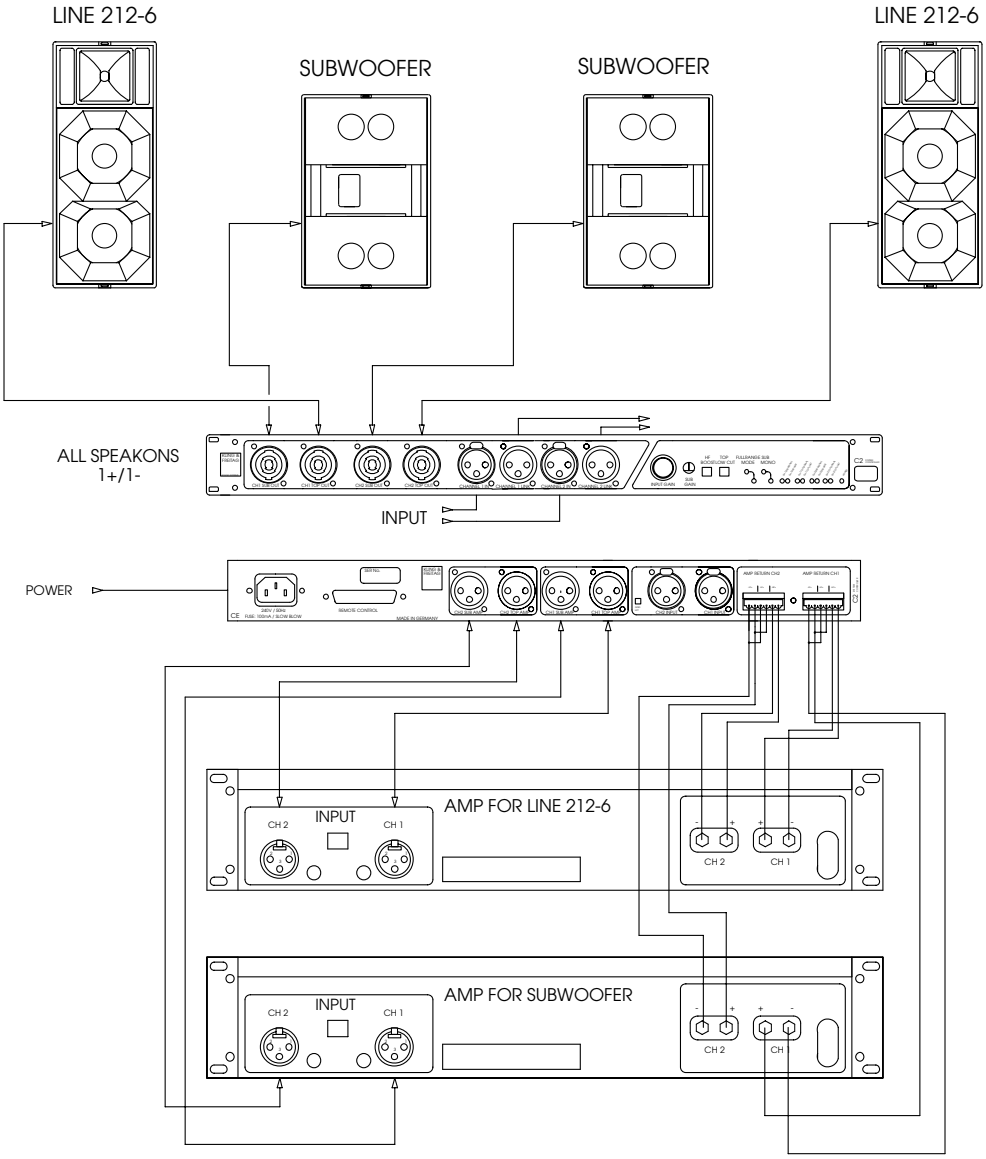
- **Never!!! try to avoid a ground loop by disconnecting or taping the protective earth contact at the mains connector! Extremely dangerous!**
- If possible, only use high-quality audio appliances with balanced signal outputs and power cords with PE connectors.
- Use high-quality cables with good shielding.
- The point of ground for all connected components should merge at one central point. The power connections should lead out in a radial manner from one point and not be linked from one unit to the next.
- When installing appliances that create strong electrostatic or electromagnetic fields (large transformers, switch-mode power supplies), maintain some distance from other audio appliances. In extreme cases, the only solution is to create a completely independent 'audio ground'; in other cases, it is sufficient to connect a filter in front of the audio equipment.

10.3 Connecting Schemes

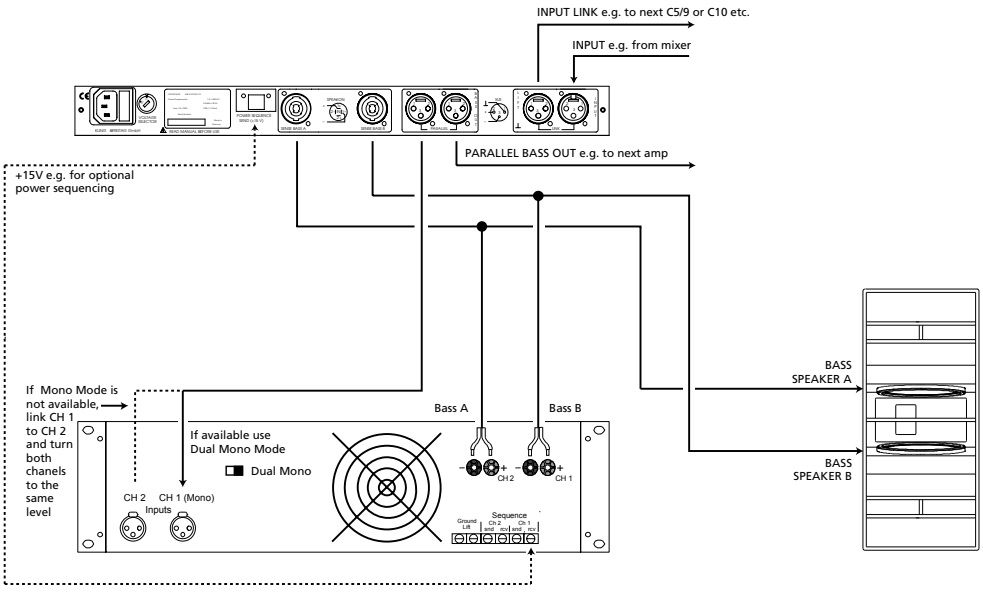
10.3.1 Line 212 with Controller C2 in Full-Range Mode



10.3.2 Line 212 and Bass with Controller C2 in 2-Way Active Mode



10.3.3 Additional Bass System B10 via Controller C10


INPUT LINK e.g. to next C5/9 or C10 etc.
INPUT e.g. from mixer
PARALLEL BASS OUT e.g. to next amp
+15V e.g. for optional power sequencing
If Mono Mode is not available, link CH 1 to CH 2 and turn both chanels to the same level
If available use Dual Mono Mode
Dual Mono
CH 2 CH 1 (Mono) Inputs
Bass A
Bass B
CH 2
CH 1
BASS SPEAKER A
BASS SPEAKER B

11. Operating the LINE 212 System

– Switch off all equipment and turn down all level controls.

– Wire the LINE 212 System according to the connecting diagrams overleaf.

– Upon completing the wiring, ensure that the connected speaker channels are working in phase. To do so, use i.e. a phase checker. A phase error can also be recognized when the connected channels are used simultaneously. During simultaneous use the bass frequencies become notably quieter or the mid-frequencies such as voices cannot be located.

– Switch on first the peripheral units (mixer, effects, etc.), then the C2 Controller and connect lastly the power amplifiers. Always adhere to this sequence when switching on your equipment. Switching on the units in a different order could cause a cracking noise, which could damage the system.

– Now turn up the input controls of the amplifier. If there is interference, turn off all appliances in the reverse order and check all cable connections (see instructions for avoiding ground loops).

– Next, turn on the C2 Controller and the other peripheral equipment and make sure there is no interference.

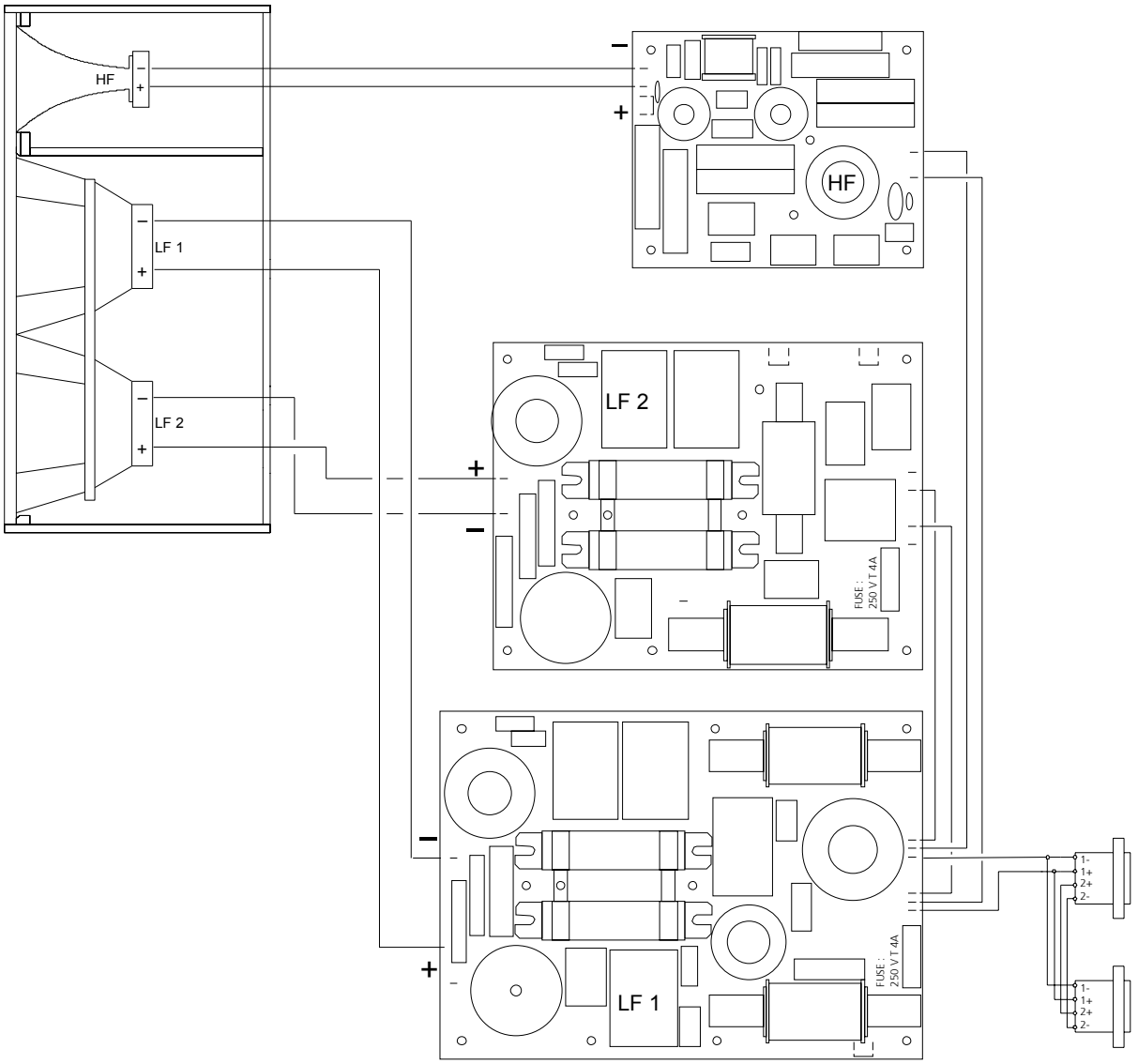
– Now put a low level signal into the system and check for the correct function of the system. In doing so, all amplifier input controls need to be turned down again. Now turn on the control for the left Line 212 system and check that the correct signal is coming out of the top speaker. The 'Sense' LED for the top speaker (i.e. CH 1 TOP signal) of the C2 Controller will light up green at a level of at ca. -40dB. The other channels of the system are checked in the same way. If the wrong LED lights up or a wrong (i.e., in 2-way active mode, low signal from a high frequency speaker) or distorted signal occurs, then there is a mistake in the wiring.

– The system is now ready to operate. The power amplifiers can now be turned on all the way. Use the gain control on the C2 Controller to set the level of the system to the desired setting.

  The levels on the mixing console can now be turned up. When turning off the system, the input controls for the power amplifiers should be turned down first followed by the power switches of the amplifiers. After that, the other appliances can be turned off.

12. Crossovers

12.1 Wiring Diagram



Pin assignment Speakon NL4				
	+	-	/	/
'IN'	1+	1-	2+	2-
'OUT'	parallel with 'IN'			

12.2 Fuses and Protection Circuits

The LINE 212 is equipped with protection circuits, which cut off the signal current when highly overloaded - for the 1.5" high frequency speaker as well as for the crossover. If the high frequency speaker of the Line 212 turns off, reduce the volume. After a few seconds, it will turn back on automatically.

If there is operating trouble, the low-mid crossover circuits are protected with fuses. Blown fuses can only be replaced with fuses with the following specifications:

250V T4L (DIN EN 60127-2-3)

Do not use fuses with different specifications and do not try to bypass the fuse as this may cause fire hazard.

13. Touching Up Damage to Paint / Changing the Front Foam

Although the PU structured paint used by KLING & FREITAG is extremely resistant, we recommend using protective covers or cases to help avoid damaging the paint during i.e. continuous mobile use. If paint damage occurs despite these precautions, it can be touched up by using commercial acrylic paint in the appropriate RAL colour of the speaker.

To replace the filter foam, send the front grille incl. foam to KLING & FREITAG GmbH. Upon payment for expenses, the grille with the new covering will be returned.

14. Technical Specifications

14.1 LINE 212-6

Loudspeaker	
Design	2+1-way passive system with FLC-technology,
	completely horn loaded, bass reflex tuning
Frequency range -10 dB	49 Hz - 20 kHz with C2 in full-range mode
	(65 Hz – 20 kHz without controller)
Frequency range ±3 dB	60 Hz - 18 kHz with C2 in full-range mode
	(130 Hz – 20 kHz without controller)
Nominal coverage angle	65° x 50° (hor. x vert.)
Directivity index (DI)	12 (+1.5 / -3) 600 Hz – 16 KHz
Power handling	600 W nominal
	1200 W programme
Sensitivity 2.83V/1m	104 dB
Max. SPL	137 dB (SPL Peak / 1 m)
Components	1 x 12" woofer, 1 x 12" low-mid chassis,
	both with horn, 1.5" high freq. driver with
	75 mm titanium dome on rotatable CD-Horn
Crossover	2+1-way crossover in FLC-technology
	(patented.), delay time and phase alignment
Impedance (nominal)	6 Ω, Zmin. 4.6 Ω
Recommended amplification	900 - 1200 W @ 8Ω per channel /
	1400 - 2000 W @ 4Ω per channel
Connectors	2 x Speakon NL4MP (1+/1-)
Enclosure	
	Trapezoidal, frame reinforced 15 mm
	Finnish birch Multiplex with highly resistant
	black structured paint (PU),
	4 butterfly handles,
	stacking foot grooves for safe and easy
	stacks of identical enclosures,
	2 locking profiles for optional transport
	cover,
	ball proof steel grille with exchangeable black
	acoustic foam
Rigging	'Suspension' with 4 flying points 'allsafe
	JUNGFALK',1 rear mounted flying track
	'allsafe JUNGFALK'
Dimensions(W x H x D)	429 x 1025 x 510 mm
Weight	57.5 kg
Options	'Terminal clamps' instead of Speakon Connector
	'Outdoor Mobile' and 'Outdoor Installation'
	'Special finish in RAL colours'
Accessories	see catalogue or visit www.kling-freitag.de

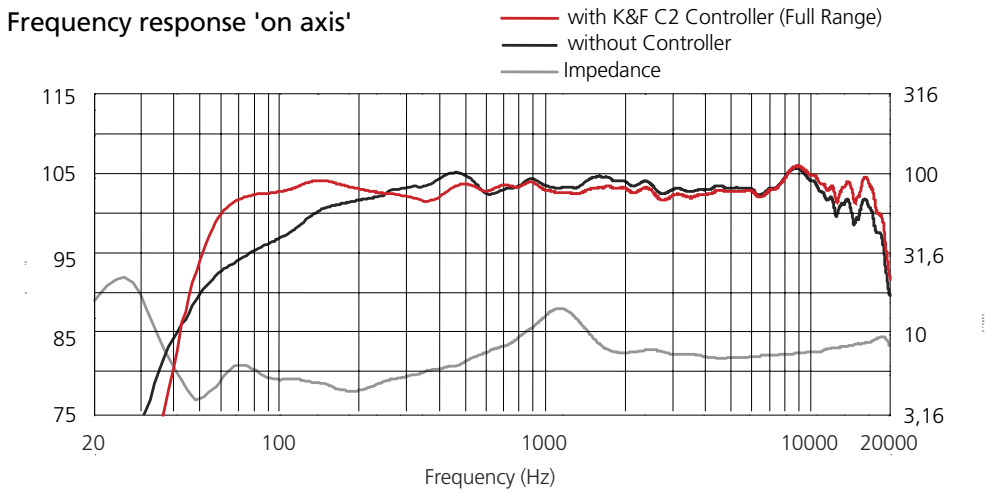
14.2 LINE 212-9

Loudspeaker	
Design	2+1-way passive system with FLC-technology,
	completely horn loaded, bass reflex tuning
Frequency range -10 dB	49 Hz - 20 kHz with C2 in full-range mode
	(65 Hz – 20 kHz without controller)
Frequency range ±3 dB	60 Hz - 18 kHz with C2 in full-range mode
	(130 Hz – 20 kHz without controller)
Nominal coverage angle	90° x 50° (hor. x vert.)
Directivity index (DI)	10 (+1.5/-3) 600 Hz - 16 kHz
Power handling	600 W nominal
	1200 W programme
Sensitivity 2.83V/1m	104 dB
Max. SPL	137 dB (SPL Peak / 1 m)
Components	1 x 12" woofer, 1 x 12" low-mid chassis,
	both with horn, 1.5'' high freq. driver with
	75 mm titanium dome on rotatable CD-Horn
Crossover	2+1-way crossover in FLC-technology
	(patented), delay time and phase alignment
Impedance (nominal)	6 Ω, Zmin. 4.6 Ω
Recommended amplification	900 - 1200 W @ 8Ω per channel /
	1400 - 2000 W @ 4Ω per channel
Connectors	2 x Speakon NL4MP (1+/1-)
Enclosure	
	Trapezoidal, frame reinforced 15 mm
	Finnish birch Multiplex with highly
	resistant black structured paint (PU),
	4 butterfly handles,
	stacking foot grooves for save and easy
	stacking of identical enclosures,
	2 locking profiles for optional transport
	cover,
	ball proof steel grille with exchangeable black
	acoustic foam
Rigging	'Suspension' with 4 flying points 'allsafe
	JUNGFALK',1 rear mounted flying track
	'allsafe JUNGFALK'
Dimensions(W x H x D)	429 x 1025 x 510 mm
Weight	57.5 kg
Options	'Terminal clamps' instead of Speakon
	'Outdoor Mobile' and Outdoor Installation'
	'Special finish in RAL colours'
Accessories	see catalogue or visit www.kling-freitag.de

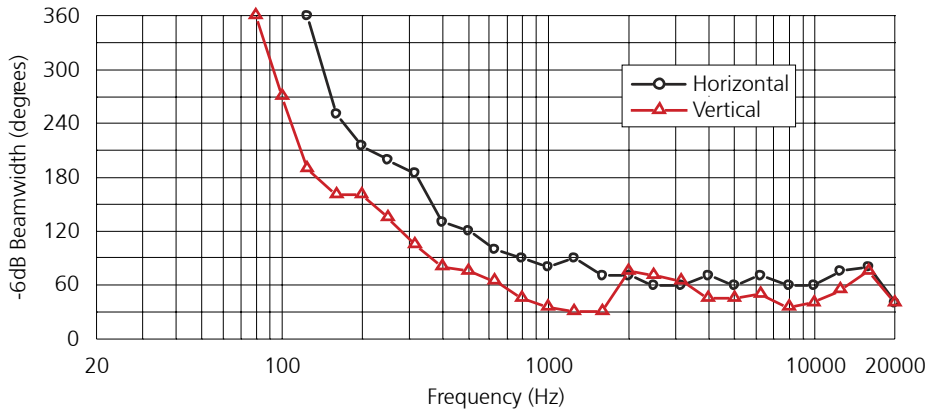
15. Measuring Charts

15.1 LINE 212-6

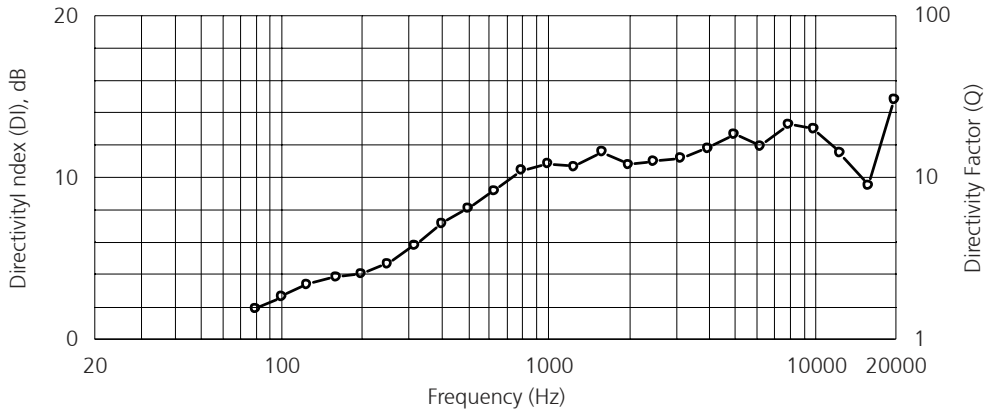
Frequency response 'on axis'



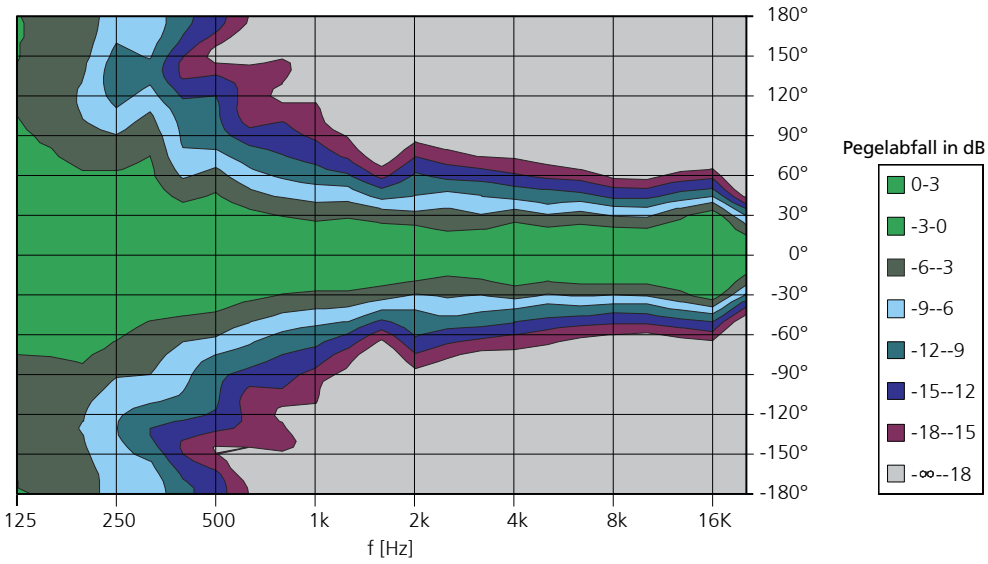
Beamwidth



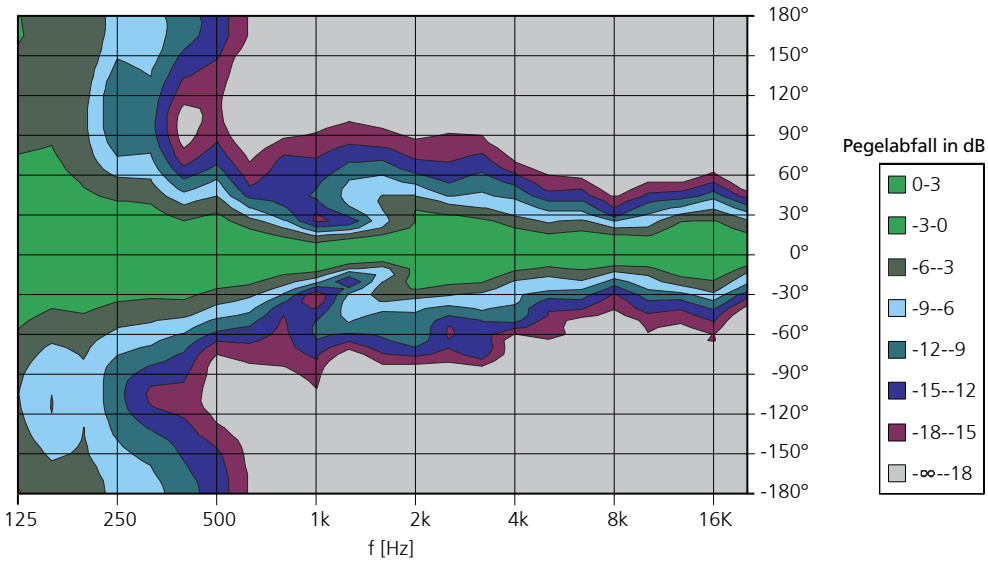
Q-Index



Horizontal coverage pattern

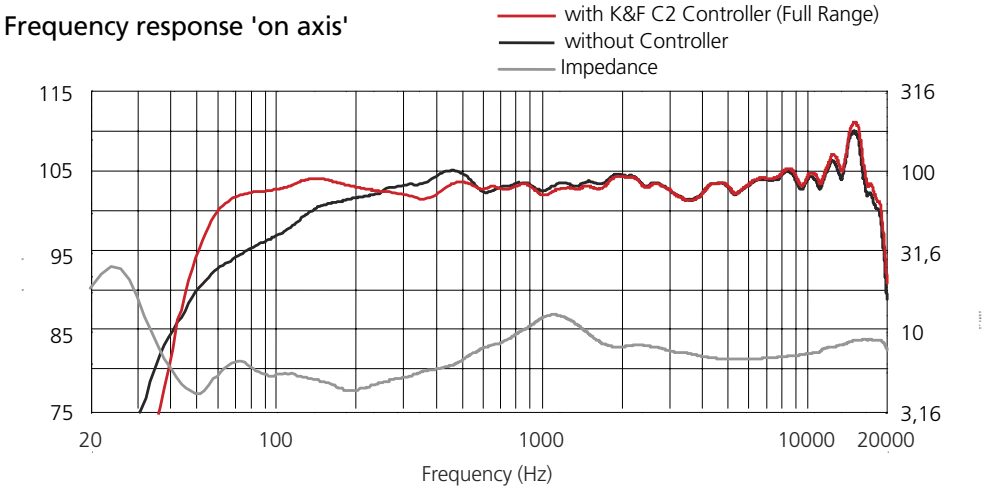


Vertical coverage pattern

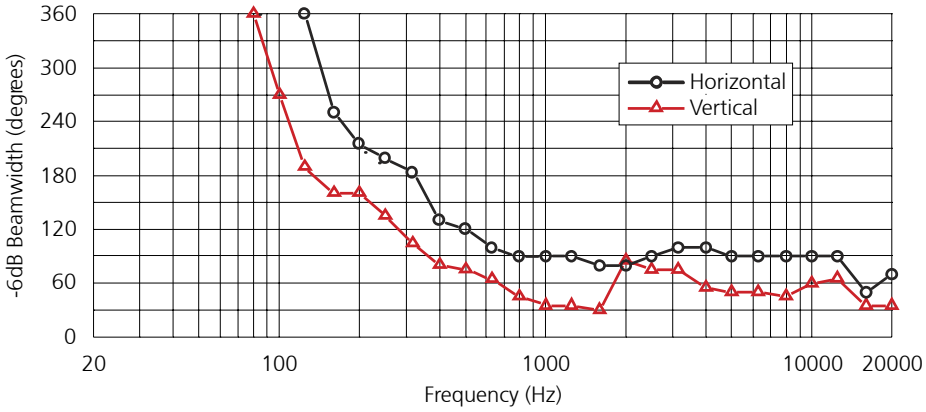


15.2 LINE 212-9

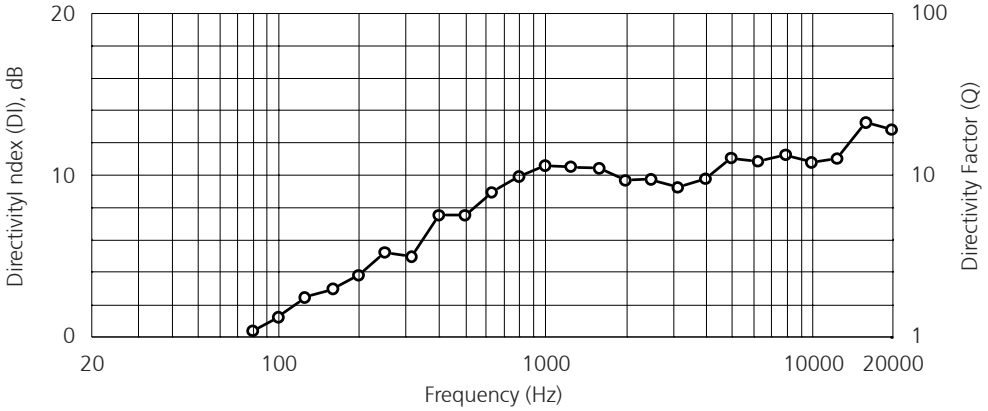
Frequency response 'on axis'



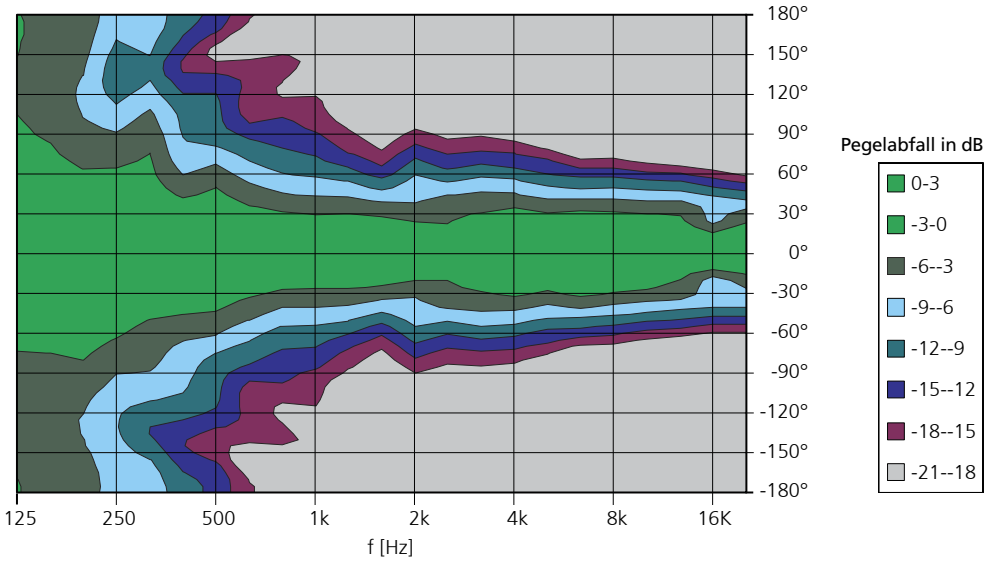
Beamwidth



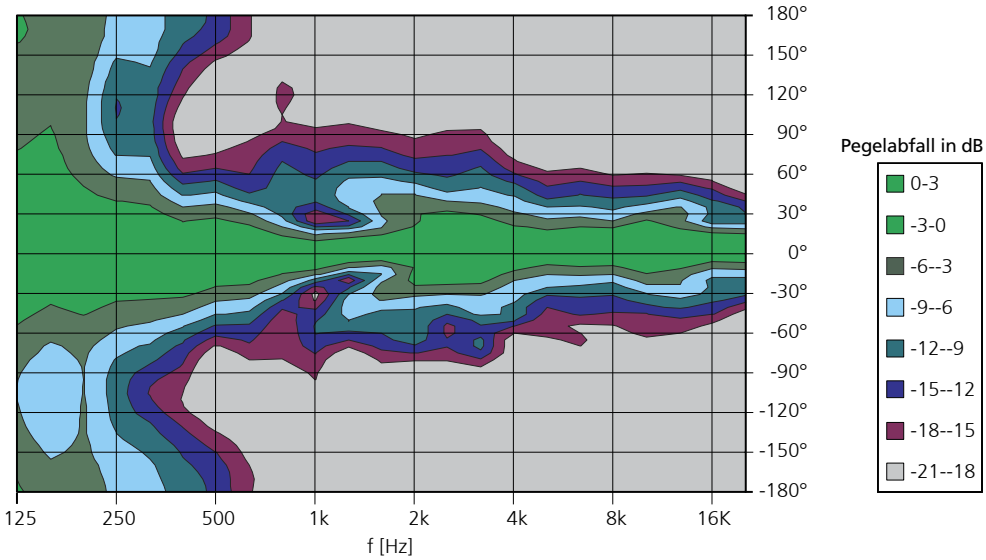
Q-Index



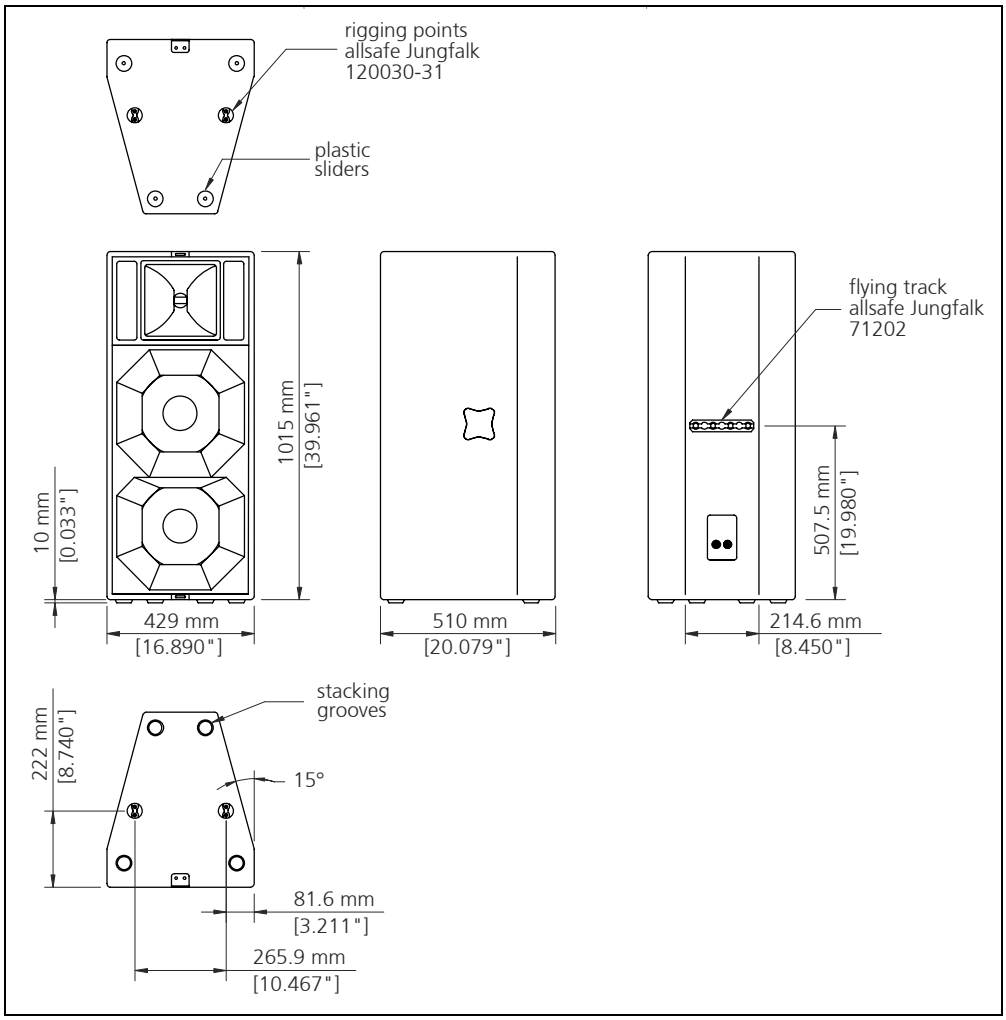
Horizontal coverage pattern



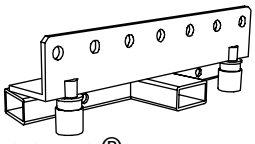
Vertical coverage pattern



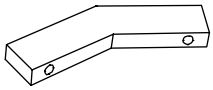
16. Dimensions



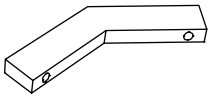
17. Accessories



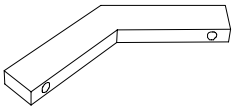
Click & Fly®



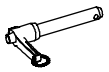
Connector 30°



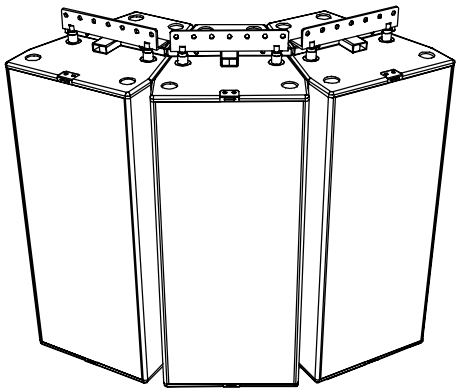
Connector 38.5°

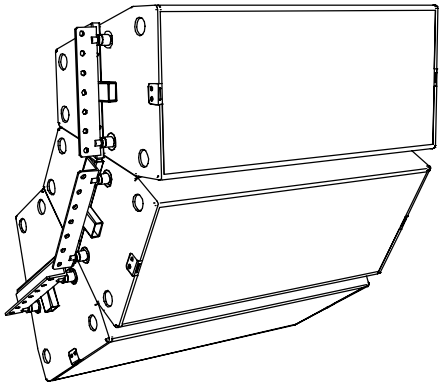


Connector 45°

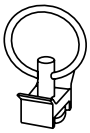


Quick Release Pin

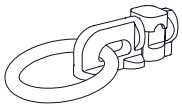




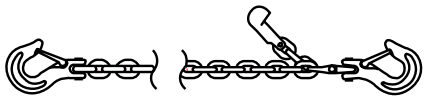
Application examples Click & Fly® LINE 212



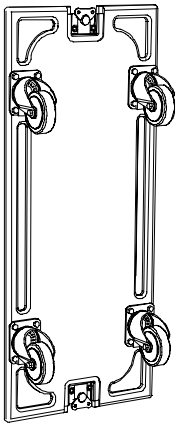
Single Stud Fitting



Double Stud Fitting



Rigging chain, adjustable (left / right)



Transport cover with castors

18. Regulations for Disposal

18.1 Germany:

It is not allowed to dispose of used electrical equipment as domestic waste.

But please do not dispose of them at official collecting points for recycling either!

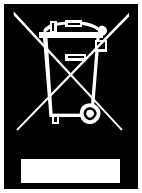
All Kling & Freitag products are plain business-to-business (B2B) products. Disposal of Kling & Freitag products labelled with a waste bin sign have thus to be disposed of by Kling & Freitag alone. Please call Kling & Freitag at the number stated below if you have a Kling & Freitag product to be disposed. We will offer you a straightforward and professional disposal not affecting costs.

If there is no dustbin sign on one of your Kling & Freitag products, because they have been sold before March 2006 then by law the owner is in charge of the disposal. For these we will be happy to assist and offer you proper ways of disposal.

Telephone number to call about the disposal of used Kling & Freitag products: +49 (511)-96 99 7-0

Explanation:

With the ElektroG (law relating to electrical and electronic equipment and appliances) we have complied with the EU-directive on waste electrical and electronic equipment (WEEE, 2002/96/EC)



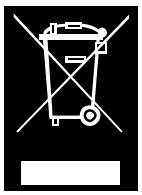
The Kling & Freitag AG has thus labelled all products mentioned in the WEEE from 03/24/2006 onwards with a sign with a crossed out waste bin and a white bar below. This sign indicates that the disposal into the domestic waste is prohibited and that the product has been put into circulation at the 03/24/2006 earliest.

The Kling & Freitag GmbH has been legally registered as a manufacturer with the registration office EAR. Our WEEE Registration-Nr. is: DE64110372

For the German Registration office EAR we have accredited that our products are sole B2B products.

18.2 EU, Norway, Island, and Liechtenstein (not Germany):

It is not allowed to dispose of used electrical equipment as domestic waste.



The Kling & Freitag AG has thus labelled all products coming from EU-Member countries as well as Norway, Island and Liechtenstein (except Germany) mentioned in the WEEE from 08/13/2005 onwards with a sign with a crossed out waste bin and a white bar below. This sign indicates that the disposal into the domestic waste is prohibited and that the product has been put into circulation at the 08/13/2005 earliest.

Unfortunately the European directive WEEE has been complied with implementing different national provisions of law throughout all member countries, which makes it impossible for us to offer consistent solutions for the disposal throughout Europe.

Responsible for complying with these provisions of law is the local distributor (importer) of each country.

For proper disposition of used products in accordance with these local provisions in the mentioned countries of the European Union (except Germany) please ask your local dealer or the local authorities.

18.3 Other countries

For proper disposition of used products in accordance with local provisions in other countries please ask your local dealer or the local authorities.